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#### **Closed Topic Search**

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 AF141-001: Non-Silicon and Non-Boron based Leading Edges for Hypersonic Vehicles

Release Date: 11-20-2013Open Date: 12-20-2013Due Date: 01-22-2014Close Date: 01-22-2014

OBJECTIVE: Identify and demonstrate a new material system with suitable material properties to realize the advanced leading edges for use in reusable or long flight time hypersonic vehicles. DESCRIPTION: Air Force-relevant applications include but not limited to sharp leading edges, rocket nozzles, throats and engine combustion parts are key components that enable hypersonic flight. These lead ...

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# **2.** AF141-002: Epitaxial Technologies for SiGeSn High Performance Optoelectronic Devices

Release Date: 11-20-2013Open Date: 12-20-2013Due Date: 01-22-2014Close Date: 01-22-2014

OBJECTIVE: Develop SiGeSn epitaxy on silicon and germanium substrates for new degrees of freedom in optoelectronic devices operating in the wavelength range between 2.0 and 5.0 micrometers. DESCRIPTION: Conventional mid-infrared materials based on the III-V (GaInSb) and the II-VI (HgCdTe) materials are relatively expensive and incompatible with silicon-based integrated circuit processing. S ...

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#### 3. AF141-003: Variable Precision Filters

Release Date: 11-20-2013Open Date: 12-20-2013Due Date: 01-22-2014Close Date: 01-22-2014

OBJECTIVE: The development of innovative mathematical techniques for the design of digital filters allowing trade-offs between accuracy, precision and memory. DESCRIPTION: The design of finite impulse response (FIR or non-recursive) and infinite impulse response (IIR or recursive) digital filters has a long history and, over the years, many methods have been developed to design FIR, IIR filt ...

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## **4.** AF141-004: Radio-frequency Micro-electromechanical Systems with Integrated Intelligent Control

Release Date: 11-20-2013Open Date: 12-20-2013Due Date: 01-22-2014Close Date: 01-22-2014

OBJECTIVE: Improve the robustness and reliability of radio-frequency microelectromechanical systems by orders of magnitude beyond the state of the art, making them suitable for defense applications. DESCRIPTION: Radio-frequency micro-electromechanical systems (RF MEMS) have many performance advantages as microwave switches, tuners, filters and phase shifters with higher linearity, lower los ...

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#### 5. AF141-005: SMART Bandage for Monitoring Wound Perfusion

Release Date: 11-20-2013Open Date: 12-20-2013Due Date: 01-22-2014Close Date: 01-22-2014

OBJECTIVE: Develop and demonstrate an innovative wound dressing that quantitatively reports tissue perfusion for monitoring and optimizing wound healing. DESCRIPTION: The current standard-of-care for wounds and grafts relies on subjective observations of tissue health that are episodic and can vary greatly between caregivers with different degrees of training (1). For example, measurements o ...

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#### 6. AF141-006: Shockwave Consolidation of Materials

Release Date: 11-20-2013Open Date: 12-20-2013Due Date: 01-22-2014Close Date: 01-22-2014

OBJECTIVE: To develop materials that are far from thermodynamic equilibrium domain (highly doped polycrystalline materials, nano-structured systems and supersaturated structures, etc.). The processing includes shockwave consolidation and external fields. DESCRIPTION: Conventional processing techniques typically prepare materials from a melt or using powder metallurgy techniques, such as hot ...

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### 7. <u>AF141-009</u>: Single Photon Sources for Free Space Quantum Key Distribution Systems

Release Date: 11-20-2013Open Date: 12-20-2013Due Date: 01-22-2014Close Date: 01-22-2014

OBJECTIVE: Develop and demonstrate an on demand single photon source for use in a free-space Quantum Key Distribution (QKD) satellite to ground configuration. DESCRIPTION: Security in quantum key distribution (QKD) arises from the principle that the quantum state of a single photon, prepared in an unknown basis, can only be determined with a probabilistic outcome. This fact both limits the ...

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#### 8. AF141-012: Rapid Mission Planning for Desirable Viewing Conditions

Release Date: 11-20-2013Open Date: 12-20-2013Due Date: 01-22-2014Close Date: 01-22-2014

OBJECTIVE: To develop a method to optimize scheduling and planning for Space Situational Awareness (SSA) collects. DESCRIPTION: The AFSPC (Air Force Space Command) Space Surveillance Network (SSN) and AFRL (Air Force Research Laboratory) utilizes a number of ground based observatory telescope systems to observe satellites and obtain awareness to support Space Situational Awareness (SSA). Th ...

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#### 9. AF141-013: Efficient Photometry

Release Date: 11-20-2013Open Date: 12-20-2013Due Date: 01-22-2014Close Date: 01-22-2014

OBJECTIVE: Decrease the time burden of photometric collection using stars serendipitously collected with optical sensors without compromising calibration accuracy and data quality. DESCRIPTION: Photometric data collection techniques have become key for space surveillance. Photometric techniques can be used on most existing electro-optical sensors and have become a routine collection method ...

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#### 10. AF141-014: Decision Aid to Threat Identification and Intent Modeling

Release Date: 11-20-2013Open Date: 12-20-2013Due Date: 01-22-2014Close Date: 01-22-2014

OBJECTIVE: Develop a method to monitor satellite observables using optical and other data sources to predict, and understand, future activities of operational satellites in orbit. DESCRIPTION: Determine future space activities by data mining to link disparate data together to determine patterns and trends that may be indicators of future events that might threaten our satellites. To accompli ...

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